ADDENDUM TO 2018 TAN SHEETS

Tempers for Aluminum and Aluminum Alloy Products Metric Edition **March 10, 2023**

New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 $\sqrt{A}$	
2043-T85	Universal Alloy	02/07/2019	Extrusion	1.00	6.30	*Min[6]	525	485	6	-	*Tentative
				6.30	12.50	*Min[6]	540	505	7	-	Cross-sectional area less than or equal to 15000 mm^2 and circle size less than or equal to 410 mm.
				12.50	25.00	*Min[6]	550	515	-	6	Solution heat treated and cold worked in the range 3-6% and artificially aged.
				25.00	60.00	*Min[6]	565	540	-	6	Stress Corrosion Resistance For ST specimens taken from section thicknesses 20 mm and greater, See footnote 4b.
											Exfoliation Corrosion Resistance See footnote 15b. Note: ASTM G85 Annex A2 Dry-Bottom MASTMAASIS Method for 2 weeks.
2050 T34	Constellium	01/25/2016 Revised 08/04/17 Revised 02/01/2019	Plate	12.50	165.00	Min[9]	345	235	-	15	Solution heat treated and cold worked 3-4.5%.
2081-T84	Kaiser	11/16/2018	Plate	25.00	50.00	*Min[6]	525	505	-	7	*Tentative
						*Min[9]	525	485	-	6	Solution heat treated and cold worked 2-5%.
				50.00	76.00	*Min[6]	510	490	-	5	
						*Min[9]	515	470	-	5	
						*Min[10]	495	425	-	2	
				76.00	100.00	*Min[6]	505	485	-	5	
						*Min[9]	510	460	-	3	
						*Min[10]	490	425	-	2	

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.
FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

ADDENDUM TO 2018 TAN SHEETS

Tempers for Aluminum and Aluminum Alloy Products Metric Edition **March 10, 2023**

New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 $\sqrt{A}$	
2050-T84	Constellium	11/21/2022	Plate	165.00	180.00	*Min[6] *Min[9] *Min[10]	485 485 470	455 435 400	- - -	3 3 1.5	*Tentative Solution heat treated and cold worked approximately 3-4.5% and artificially aged.
				180.00	200.00	*Min[6] *Min[9] *Min[10]	475 475 455	450 425 395	- - -	3 2 1.5	Stress Corrosion Resistance For thicknesses 165.00 – 200.00 mm. Direct C-rings and Tensile specimens machined and tested in accordance with ASTM G47 shall show no evidence of stress corrosion failure when tested in the short transverse direction at 310 MPa and exposed for 30 days. Fracture Toughness[14] – Min K_{IC} For thicknesses 165.00 – 180.00 mm L-T direction 24 MPa√m T-L direction 20 MPa√m S-L direction 18 MPa√m For thicknesses 180.00 – 200.00 mm L-T direction 22 MPa√m T-L direction 18 MPa√m S-L direction 16 MPa√m

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

ADDENDUM TO 2018 TAN SHEETS

Tempers for Aluminum and Aluminum Alloy Products Metric Edition **March 10, 2023**

New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 √A	
2297-T87	McCook Metals Constellium	06/21/2000 Revised 06/03/2004 Revised 01/12/2022	Plate	40.00	50.00	Min[6] Min[9] Min[10]	440 455 450	400 415 395	- - -	9 7 2	Stress Corrosion Resistance 30 days at 310 MPa when tested in the ST direction per ASTM G47 in the thickness range of 80.00-130.00 mm. Product outside this thickness rage will continue to exhibit capability of 30 days at 205 MPa. Exfoliation Corrosion Resistance See footnote 15.b. Fracture Toughness[14] – Min K_{Ic} For thicknesses over 40.00 thru 80.00 mm L-T direction 35 MPa √m T-L direction 30 MPa √m S-L direction 22 MPa √m For thicknesses over 80.00 thru 100.00 mm L-T direction 34 MPa √m T-L direction 30 MPa √m S-L direction 22 MPa √m For thicknesses over 100.00 thru 125.00 mm L-T direction 33 MPa √m T-L direction 29 MPa √m S-L direction 20 MPa √m For thicknesses over 125.00 thru 160.00 mm L-T direction 32 MPa √m T-L direction 27 MPa √m S-L direction 20 MPa √m
				50.00	60.00	Min[6] Min[9] Min[10]	435 440 440	395 400 385	- - -	8 6 2	
				60.00	80.00	Min[6] Min[9] Min[10]	425 440 425	395 400 380	- - -	8 6 2	
				80.00	100.00	Min[6] Min[9] Min[10]	430 430 405	395 395 370	- - -	4 3 1.5	
				100.00	125.00	Min[6] Min[9] Min[10]	420 420 400	385 385 360	- - -	4 3 1.5	
				125.00	160.00	Min[6] Min[9] Min[10]	415 415 395	380 380 360	- - -	4 3 1.5	
2397-T87	Alcoa Revised Arconic	02/12/2003 Revised 08/17/2005 Revised 08/02/2018	Plate	80.00	100.00	Min[6] Min[9] Min[10]	425 425 415	395 395 370	- - -	4 4 1.5	Stress Corrosion Resistance See footnote 4.b. Exfoliation Corrosion Resistance See footnote 15.b. Fracture Toughness[14] – Min K_{Ic} For thickness over 80.00 thru 100.00 L-T direction 34 MPa √m T-L direction 30 MPa √m S-L direction 22 MPa √m

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

ADDENDUM TO 2018 TAN SHEETS

Tempers for Aluminum and Aluminum Alloy Products Metric Edition **March 10, 2023**

New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 $\sqrt{A}$	
6061-T651	Constellium	09/09/2019	Plate	152.00	203.00	*Min[9]	290	250	-	8	*Tentative
				203.00	254.00	*Min[9]	280	235	-	7	
				254.00	305.00	*Min[9]	275	220	-	7	
7048-T6511	Kaiser	04/08/2020	Extrusion	1.00	3.20	Min[6]	465	435	10	-	
7055-T76511	Alcoa	01/15/2001	Extruded Rod, Bar & Profiles	-	6.30	Min[6]	615	585	7	-	Exfoliation Corrosion Resistance See footnote 15.b.
		Revised 06/20/2007		6.30	12.50	Min[6]	620	585	9	-	For thickness up thru 12.50 mm Cross Sectional Area 7700 square mm max. and Circle Size 250 mm max.
	Revised Arconic	Revised 08/14/2020		12.50	80.0	Min[6]	625	595	-	8	For thickness 12.50 – 80.0 mm Cross Sectional Area 17000 square mm max. and Circle Size 390 mm max. Longitudinal Compressive Yield Strength: 600 MPa.

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.
FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 $\sqrt{A}$	
7160-T7351	Constellium	11/08/2018 Revised 02/06/2020	Plate	25.00	40.00	Min[6]	510	460	-	11	Stress Corrosion Resistance
						Min[9]	510	450	-	10	See footnote 4e.
				40.00	50.00	Min[6]	505	460	-	11	Fracture Toughness[14] – Min K_{IC} or K_Q
						Min[9]	505	450	-	10	For thicknesses 25.00 thru 80.00 mm
											L-T direction 44 MPa√m
				50.00	80.00	Min[6]	495	450	-	10	T-L direction 37 MPa√m
						Min[9]	505	440	-	9	For thicknesses 50.00 thru 80.00 mm
						Min[10]	485	405	-	5	L-T direction 49 MPa√m
											T-L direction 36 MPa√m
				80.00	100.00	Min[6]	490	440	-	10	S-L direction 38 MPa√m
						Min[9]	495	435	-	8	For thicknesses 80.00 thru 100.00 mm
						Min[10]	485	400	-	4	L-T direction 42 MPa√m
											T-L direction 33 MPa√m
				100.00	120.00	Min[6]	485	440	-	10	S-L direction 37 MPa√m
						Min[9]	495	425	-	7	For thicknesses 100.00 thru 120.00 mm
						Min[10]	475	400	-	4	L-T direction 40 MPa√m
				120.00	150.00	Min[6]	485	435	-	10	T-L direction 30 MPa√m
						Min[9]	490	420	-	6	S-L direction 34 MPa√m
						Min[10]	470	400	-	3	For thicknesses 120.00 thru 150.00 mm
											L-T direction 31 MPa√m
											T-L direction 27 MPa√m
											S-L direction 29 MPa√m

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.
FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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Tempers for Aluminum and Aluminum Alloy Products Metric Edition **March 10, 2023**

New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 $\sqrt{A}$	
7160-T7451	Constellium	11/02/2018	Plate	25.00	40.00	*Min[6]	530	490	-	12	*Tentative
						*Min[9]	525	475	-	11	Stress Corrosion Resistance
											See footnote 4b.
				40.00	50.00	*Min[6]	530	490	-	12	
						*Min[9]	525	475	-	10	Fracture Toughness[14] – Min K_{IC} or K_Q
						*Min[10]	505	440	-	5	For thicknesses 25.00 thru 40.00 mm
											L-T direction 37 MPa√m
				50.00	80.000	*Min[6]	515	475	-	11	T-L direction 32 MPa√m
						*Min[9]	515	470	-	10	
						*Min[10]	505	440	-	5	For thicknesses 40.00 thru 50.00 mm
											L-T direction 37 MPa√m
				80.00	100.00	*Min[6]	505	470	-	11	T-L direction 32 MPa√m
						*Min[9]	515	460	-	9	
						*Min[10]	495	425	-	4	For thicknesses 50.00 thru 80.00 mm
											L-T direction 35 MPa√m
				100.00	120.00	*Min[6]	495	460	-	10	T-L direction 30 MPa√m
						*Min[9]	510	455	-	8	S-L direction 31 MPa√m
						*Min[10]	485	420	-	3	
											For thicknesses 80.00 thru 100.00 mm
				120.00	150.00	*Min[6]	495	455	-	9	L-T direction 33 MPa√m
						*Min[9]	505	450	-	5	T-L direction 27 MPa√m
						*Min[10]	475	420	-	2	S-L direction 30 MPa√m
											For thicknesses 100.00 thru 120.00 mm
											L-T direction 31 MPa√m
											T-L direction 26 MPa√m
											S-L direction 29 MPa√m
											For thicknesses 120.00 thru 150.00 mm
											L-T direction 29 MPa√m
											T-L direction 24 MPa√m
											S-L direction 27 MPa√m

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 $\sqrt{A}$	
7160-T7651	Constellium	12/05/2017 Revised 12/19/2018	Plate	25.00	40.00	Min[6]	545	510	-	11	Stress Corrosion Resistance See footnote 4a. Fracture Toughness[14] – Min K_{IC} or K_Q For thicknesses 25.00 thru 50.00 mm L-T direction 37 MPa√m T-L direction 32 MPa√m For thicknesses 50.00 thru 80.00 mm L-T direction 35 MPa√m T-L direction 30 MPa√m S-L direction 32 MPa√m For thicknesses 80.00 thru 100.00 mm L-T direction 32 MPa√m T-L direction 29 MPa√m S-L direction 31 MPa√m For thicknesses 100.00 thru 120.00 mm L-T direction 27 MPa√m T-L direction 26 MPa√m S-L direction 29 MPa√m For thicknesses 120.00 thru 150.00 mm L-T direction 24 MPa√m T-L direction 25 MPa√m S-L direction 26 MPa√m
						Min[9]	540	495	-	11	
				40.00	50.00	Min[6]	540	510	-	10	
						Min[9]	540	495	-	10	
						Min[10]	515	455	-	5	
				50.00	80.000	Min[6]	525	495	-	10	
						Min[9]	530	490	-	10	
						Min[10]	510	450	-	4	
				80.00	100.00	Min[6]	515	495	-	10	
						Min[9]	530	485	-	9	
						Min[10]	505	440	-	4	
				100.00	120.00	Min[6]	510	490	-	10	
						Min[9]	525	475	-	8	
						Min[10]	505	440	-	4	
				120.00	150.00	Min[6]	510	485	-	9	
						Min[9]	515	470	-	7	
						Min[10]	495	435	-	4	
7085-T711	Aloca Revised Arconic	10/25/2011 Revised 08/02/2018	Plate	12.50	40.00	Min[9]	550	510	-	10	Solution heat treated, stretched 1.5 to 3%, and overaged for ballistic performance. Over 12.50 thru 80.00 plate meets armor plate requirements of MIL-DTL-32375 (MR) Class I Type A. Exfoliation Corrosion Resistance See footnote 15.b.
				40.00	50.00	Min[9]	540	505	-	10	
				50.00	80.00	Min[9]	530	495	-	9	
				80.00	100.00	Min[9]	525	485	-	6	

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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New and Revised Registrations Since Publication of 2018 Tan Sheets

Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in[21]		Remarks[2]
Alloy Temper	By	Date		Over	Thru	Basis[1]	Ult.	Yield	50 mm	5D or 5.65 $\sqrt{A}$	
7085-T721	Alcoa Revised Arconic	10/27/2011 Revised 08/02/2018	Plate	12.50	40.00	Min[9]	470	415	-	10	Solution heat treated, stretched 1.5 to 3%, and overaged for blast performance. Over 12.50 thru 80.00 plate meets armor plate requirements of MIL-DTL-32375 (MR) Class I Type B. Exfoliation Corrosion Resistance See footnote 15.b.
				40.00	50.00	Min[9]	460	405	-	10	
				50.00	80.00	Min[9]	460	400	-	10	
				80.00	100.00	Min[9]	455	395	-	9	
7099-T731	Kaiser	03/13/2020	Plate	50.00	80.00	*Min[9]	470	400	-	10	*Tentative Solution heat treated, stretched 1.5 to 3%, and artificially aged to meet armor plate requirements. Developed to meet armor plate requirements of MILDTL-32375 (Revision B Amendment 2). Exfoliation Corrosion Resistance See footnote 15.b.
A206-T4	Eck Industries	09/14/2020	Sand Casting	-	-	Min	350	215	9	-	Properties are from separate standard cast coupons.
A206-T7	Eck Industries	09/14/2020	Sand Casting	-	-	Min	345	240	2	-	Properties are from separate standard cast coupons.
E357-T6	Eck Industries	02/17/2017	Sand Casting	-	-	Min	276	234	1	-	Values represent properties obtained from separately cast bars and are derived from ASTM B-26, Standard Specification for Aluminum-Alloy Sand Castings.

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.
FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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Tempers for Aluminum and Aluminum Alloy Products Metric Edition **March 10, 2023**

Tentative Removed			
Alloy Temper	**Product**	**By**	**Revised Date**
2397-T87	Plate	Arconic	08/02/2018
7085-T711	Plate	Arconic	08/02/2018
7085-T721	Plate	Arconic	08/02/2018
7160-T7351	Plate	Constellium	02/06/2020
7160-T7651	Plate	Constellium	12/19/2018
2050-T34	Plate	Constellium	02/01/2019

Deactivated Registrations		
Alloy Temper	**Product**	**Date Deactivated**
Alclad 2024-O[2]	Sheet & Plate	04/11/2018
Alclad 2024-T351[2]	Plate	04/11/2018
Alclad 2024-T42[2]	Sheet & Plate	04/11/2018
1 ½% Alclad 2024-O[2]	Sheet & Plate	04/11/2018
1 ½% Alclad 2024-T351[2]	Plate	04/11/2018
1 ½% Alclad 2024-T42[2]	Sheet & Plate	04/11/2018

[++]Deactivation is limited to specific gauge range(s) for the product indicated

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.
FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.